

DESIGNING MOBILE-FRIENDLY VOCABULARY MATERIALS FOR GRADE EIGHT STUDENTS IN RURAL INDONESIA

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ABSTRACT

This study aims to develop mobile-friendly vocabulary learning materials to support English learning beyond the classroom for eighth-grade students in rural Indonesia. It addresses the limited availability of accessible vocabulary resources and the need for flexible learning tools suited to students' contexts. The study employed a Research and Development (R&D) design using the 4D model (Define, Design, Develop, Disseminate). The participants were 28 eighth-grade students of SMPN 1 Bua. Data were collected through a 20-item needs analysis questionnaire, expert validation checklists covering content, language, and design aspects, a student practicality questionnaire, and follow-up interviews. The data were analyzed descriptively using mean scores and percentages. The findings of the needs analysis revealed that 89.3% of students did not have a dedicated vocabulary book, 50% identified vocabulary as their main difficulty in learning English, and 75% expressed a preference for mobile-accessible learning materials. The developed product was evaluated by experts and achieved validity scores of 80% (content), 88.75% (language), and 91.5% (design), indicating that it is categorized as Good to Excellent and suitable for use with minor revisions. Furthermore, student responses during the try-out phase showed that the materials were easy to understand, visually engaging, and effective in supporting flexible learning outside the classroom. In conclusion, the development of mobile-friendly, needs-based vocabulary materials have the potential to enhance learning accessibility and support more equitable English as a Foreign Language (EFL) instruction in rural educational contexts.

Keywords: mobile-friendly learning, vocabulary material development, rural EFL learners, and instructional design.

1) INTRODUCTION

Vocabulary mastery is considered one of the most important aspects of language learning because it directly influences students' ability to understand texts, communicate ideas, and participate in academic activities. In English as Foreign Language (EFL) contexts, vocabulary learning often becomes a major challenge due to limited exposure to English outside the classroom. Students who have insufficient vocabulary knowledge usually experience difficulties in reading, writing, speaking, and listening activities.

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In Indonesia, English is taught as a foreign language, and opportunities to practice English in daily life are relatively limited, especially in rural areas. Rural students often face additional challenges such as limited learning resources, lack of supporting materials, and inadequate technological infrastructure. Many students rely only on textbooks and teacher explanations **during classroom instruction**. Consequently, vocabulary learning frequently focuses on memorization rather than meaningful use in communication.

Previous studies have shown that mobile-assisted language learning (MALL) can improve vocabulary learning by providing flexible access to learning materials through smartphones. Mobile learning allows students to study independently outside classroom hours and supports repeated exposure to vocabulary. Several researchers also found that contextual and visually attractive materials can increase learner motivation and engagement in vocabulary learning.

However, many previous studies focused on urban learning environments with stable internet access and interactive applications. Few studies have specifically developed validated mobile-friendly vocabulary materials suitable for junior high school students in rural Indonesia. In addition, many existing studies emphasized the effectiveness of applications rather than designing simple and accessible materials that can be used offline.

Based on these issues, this study aimed to develop and evaluate mobile-friendly vocabulary materials for Grade Eight students in rural Indonesia. The study focused on identifying students' needs, designing vocabulary materials based on those needs, and evaluating the validity and practicality of the developed product.

The research questions of this study were:

- a. What are the vocabulary learning needs of Grade Eight students in rural Indonesia?
- b. How can mobile-friendly vocabulary materials be designed based on students' needs?
- c. How valid and practical are the developed mobile-friendly vocabulary materials?
- d. How do students respond to the developed materials?

This study is expected to contribute both theoretically and practically. Theoretically, it supports the discussion of vocabulary instruction and mobile-assisted language learning in rural EFL contexts. Practically, it provides teachers and students with accessible vocabulary learning materials that can support independent learning outside the classroom.

2) METHODS

This study employed a Research and Development (R&D) method using the 4D development model proposed by Thiagarajan, consisting of Define, Design, Develop, and Disseminate stages. The model was selected because it provides a systematic framework for developing educational products based on learners' needs.

The study was conducted at SMPN 1 Bua, South Sulawesi, Indonesia. The participants were 28 Grade Eight students selected through population sampling because all students in the target class participated in the study. One English teacher was also involved during the needs analysis stage.

Several instruments were used to collect the data. First, a 20-item needs analysis questionnaire was distributed to identify students' difficulties, learning preferences, and learning conditions. Second, expert validation questionnaires were given to content, language, and design experts to evaluate the quality of the developed product. Third, a student practicality questionnaire was used to gather feedback after product implementation. Finally, interviews with students and the English teacher were conducted to obtain additional qualitative information.

During the Define stage, the researcher conducted classroom observation, distributed the needs analysis questionnaire, and interviewed the teacher to identify students' vocabulary learning problems. In the Design stage, the researcher developed a prototype of vocabulary materials consisting of thematic units, vocabulary lists, mini-dialogues, and practice tasks.

In the Develop stage, the prototype was evaluated by three experts covering content, language, and design aspects. The researcher revised the product based on expert suggestions. In the Disseminate stage, the product was implemented on a limited scale, and students used both the printed and mobile PDF versions.

The data were analyzed descriptively using percentages and mean scores. Validation results were categorized into four levels: Excellent, Good, Fair, and Poor.

3) RESULTS

Define stage

The results of the need analysis questionnaire are shown below.

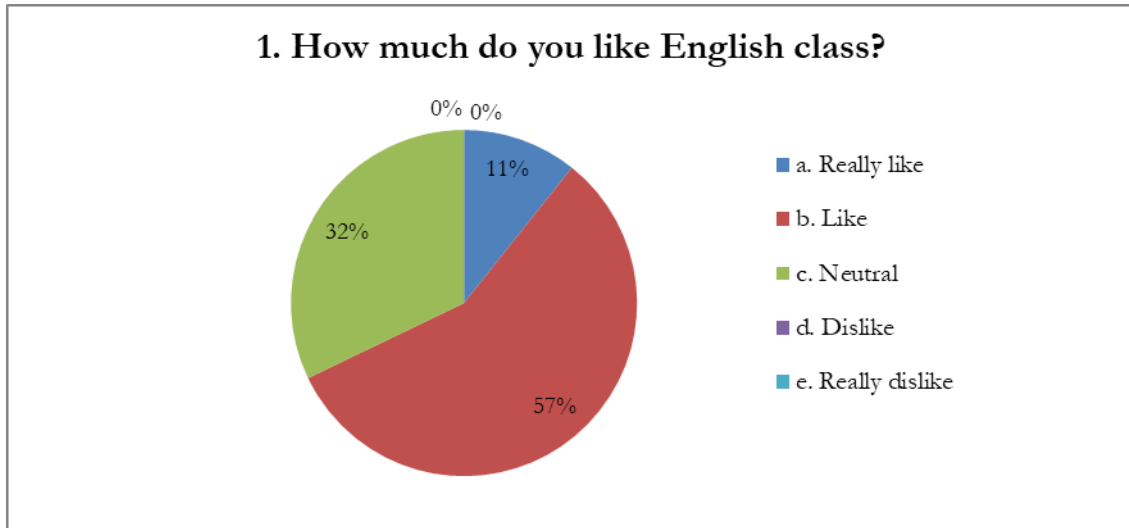


Chart 1. The result of students percentage like English class

The researcher's purpose in the question which can be seen in the chart 4.1 is to find out whether students like learning English. The researcher gave five choices, and choice B (like) was the most popular choice with a score of 57%.

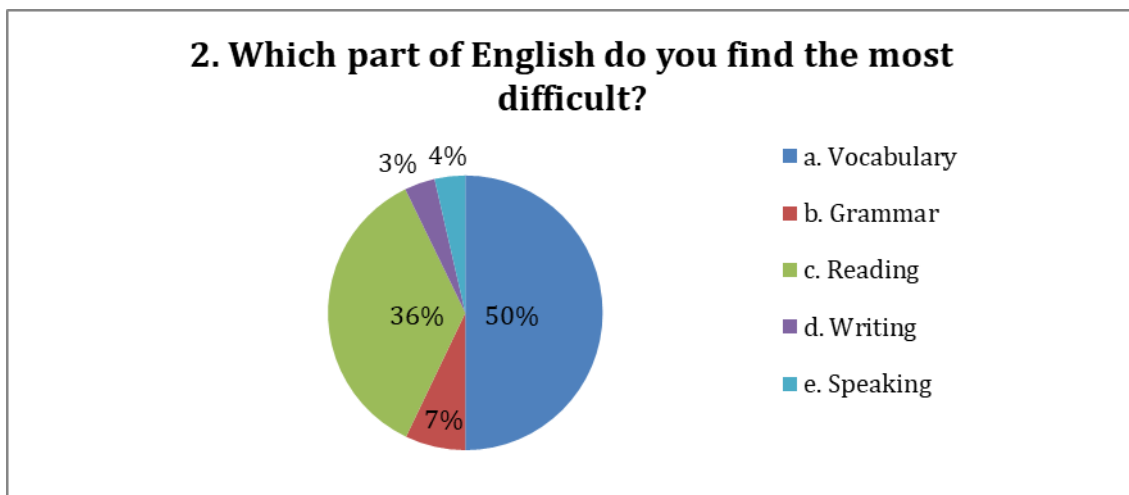


Chart 2. The result of students' percentage of English parts that find most difficult

Chart 2 aims to identify which part of English is the most difficult according to the respondents. The researcher provided five options, with the most selected option being A (Vocabulary) with a score of 50%.

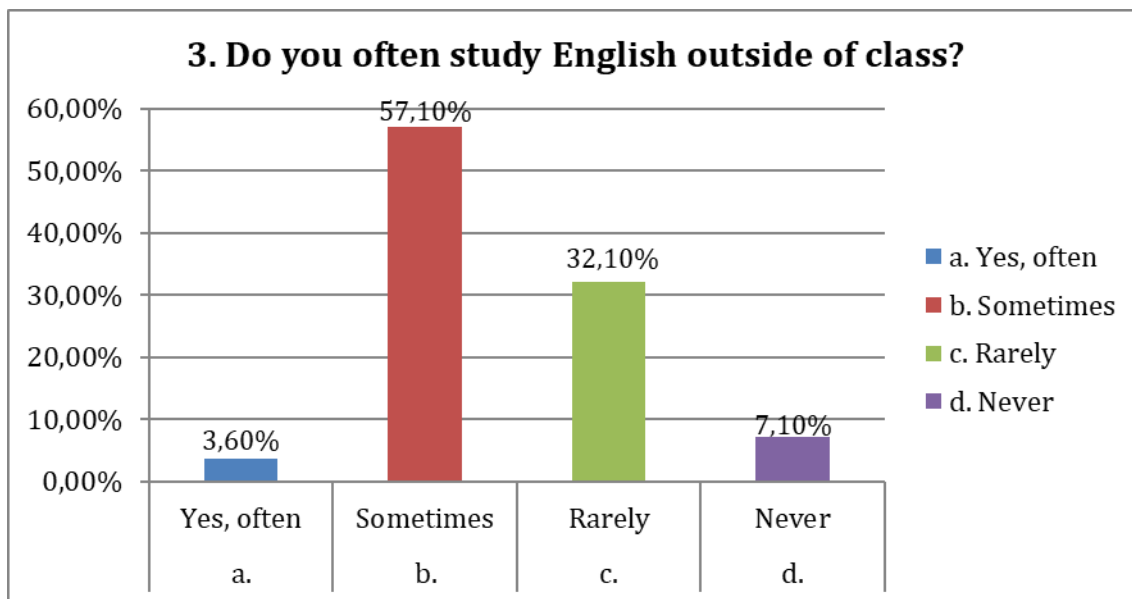


Chart 3. The result of students percentage how often students study English outside of class.

The researcher's purpose in chart 3 is to find out how often students study outside of class. Based on the chart above, option B (sometimes) with a value of 57.10% is the option most frequently chosen by students.

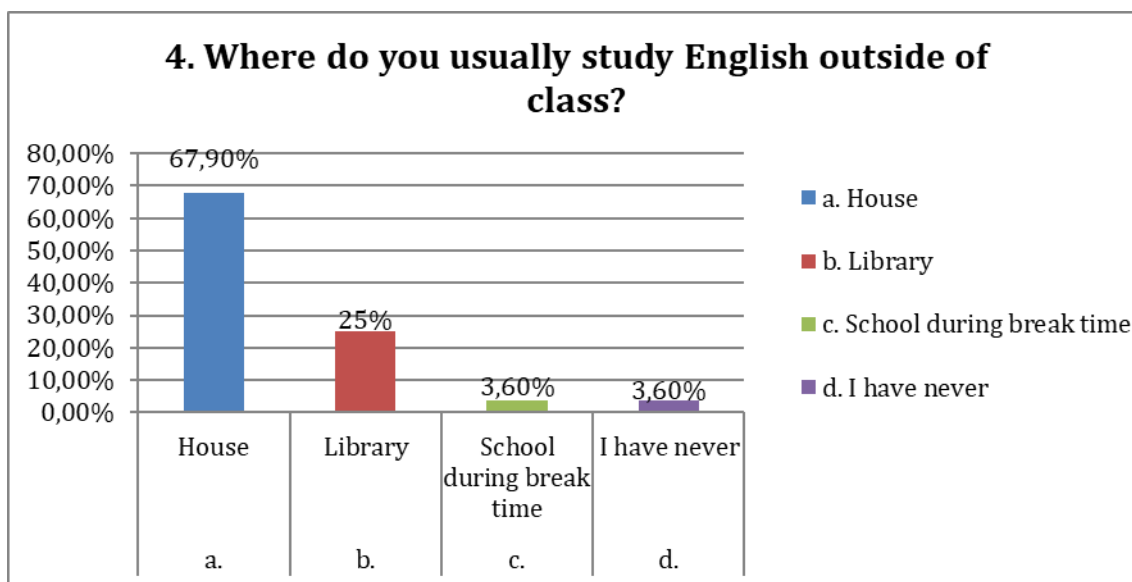


Chart 4. The result of students percentage of English parts that students find most difficult

In chart 4, the researcher aims to find out where students usually learn English outside of class. The chart above shows that among the four options presented by the researcher, option A (House) received a higher score of 67.90%.

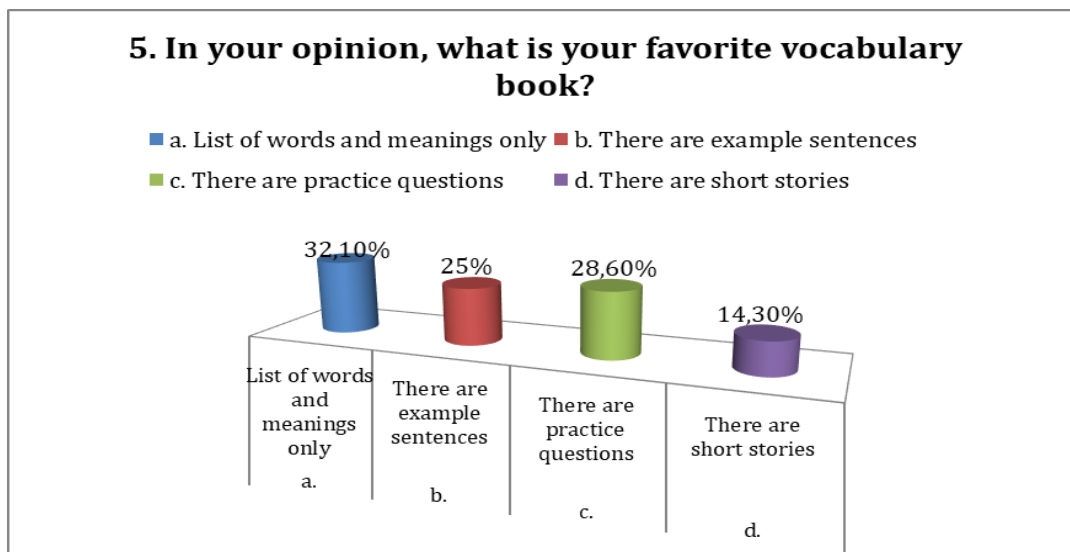


Chart 5. The result of students' percentage of favorite vocabulary book

The chart 5 aims to identify what kind of vocabulary books they like. Based on the chart above, 32.10% of the 28 students chose A (List of words and their meanings only), 25% of the 28 students chose B (There are example sentences), 28.60% of the 28 students chose C (There are practice questions), and 14.30% of the 28 students chose D (There are short stories).

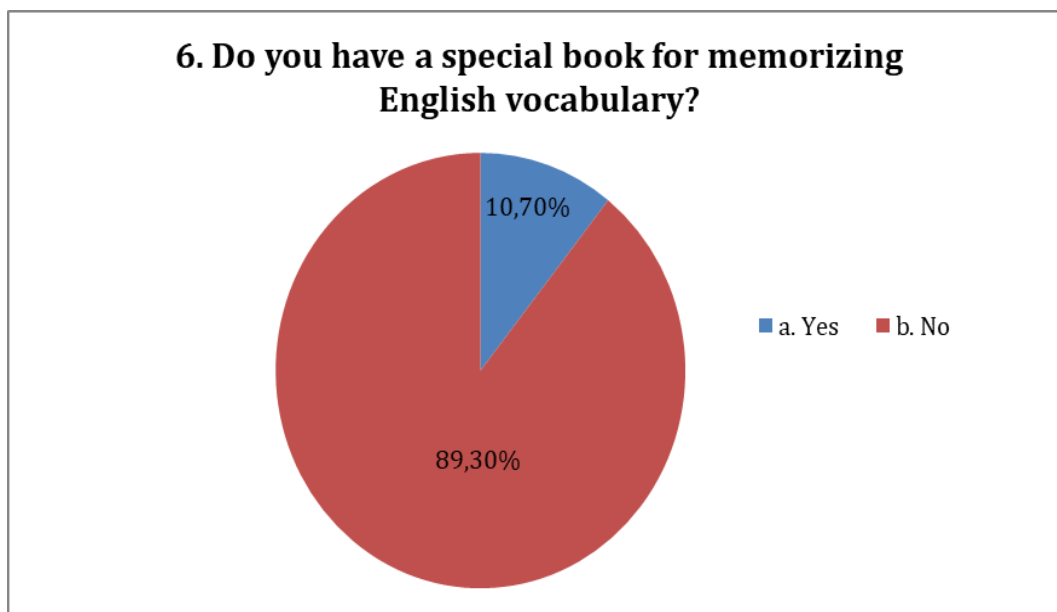


Chart 6. The result of students' percentage that have special books for memorizing vocabulary

The chart 6 above shows that students do not have special books for memorizing vocabulary. The chart shows that option B (No) was the most popular choice, with 89.30%.

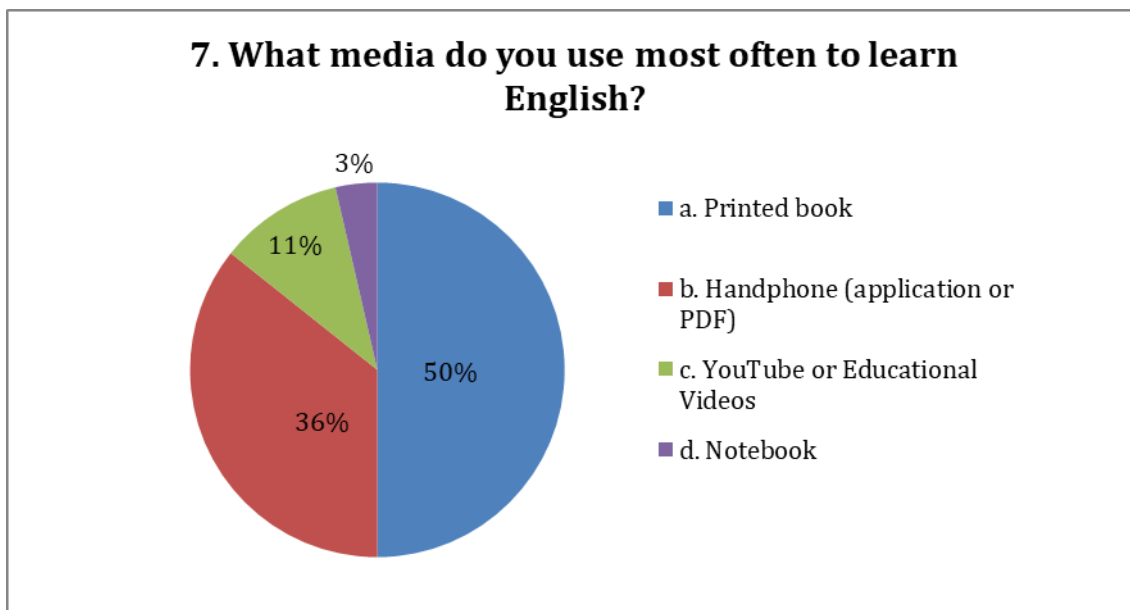


Chart 7. The result of students' percentage that have special books for memorizing vocabulary

The chart 7 above is used to identify what media they often use in learning English. The chart above shows four options, and the most popular choice among students is A (Printed book) with the highest score of 50%.

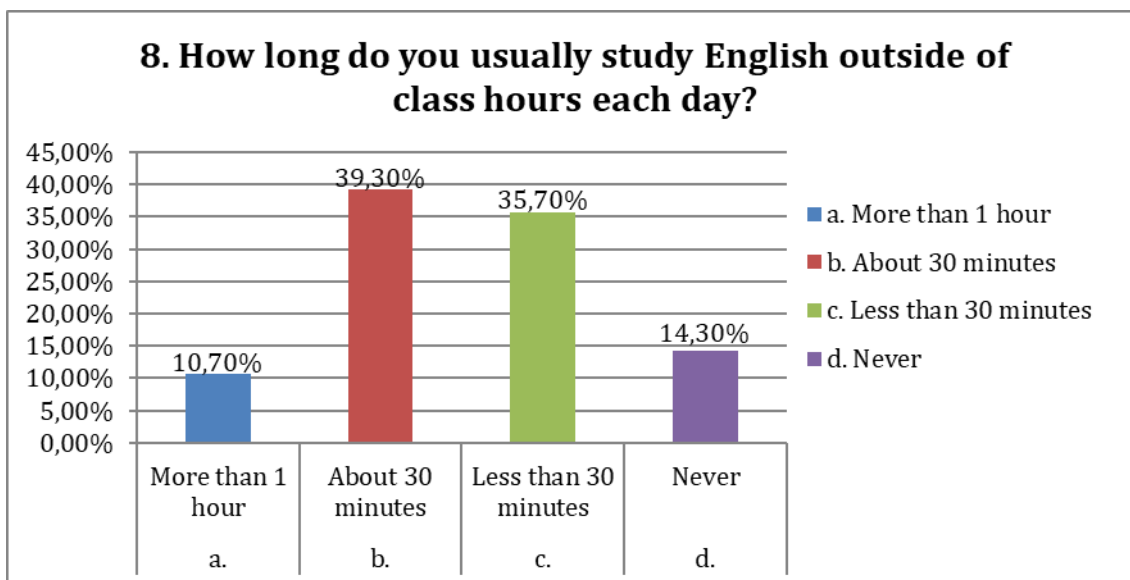


Chart 8. The result of students' percentage of hours they usually spend learning English outside of class

In Chart 8 above, the researcher's objective was to measure how often students study English outside of class hours, which could indicate their level of interest in studying outside of class hours. There were four options provided by the researcher, and the results showed that the option most frequently chosen by students was B (About 30 minutes) with a percentage of 39.30%.

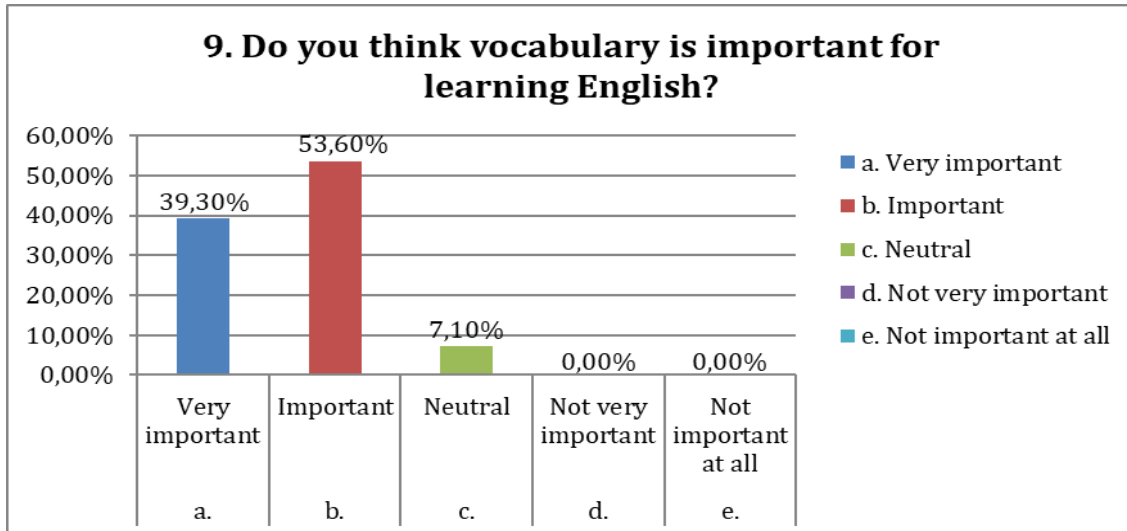


Chart 9. The result of students' percentage of opinions about vocabulary is important for learning English

The researcher's objective in chart 9 above is to understand students' opinions about the importance of learning vocabulary. Based on the chart above, it can be concluded that option B (Important) is the option most frequently chosen by students, with a percentage of 53.60%.

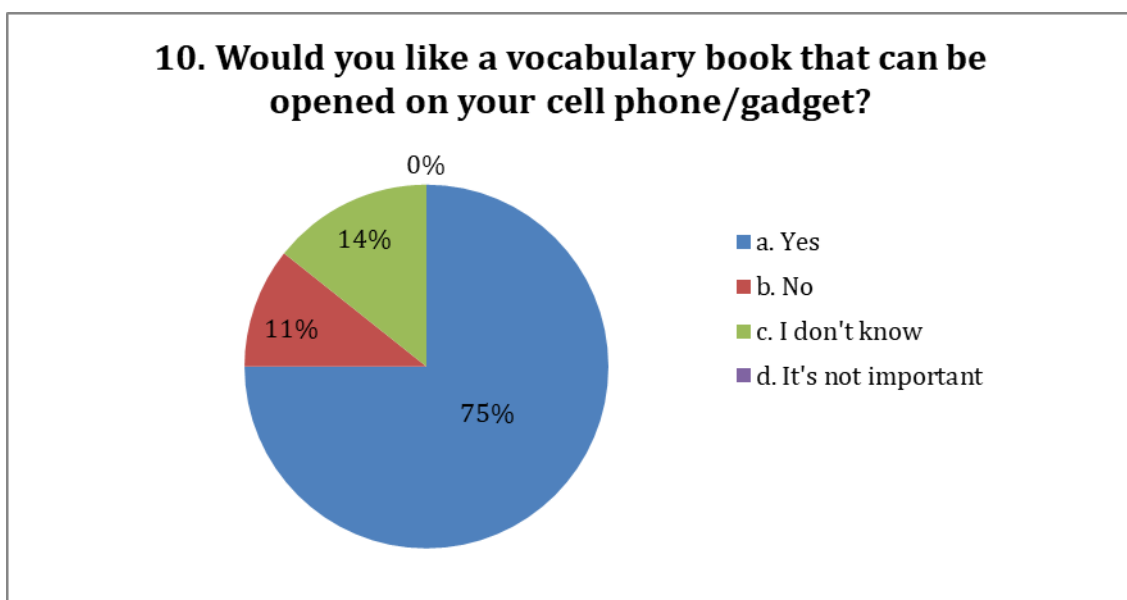


Chart 10. The result of students' percentage of students need vocabulary books that can be open on mobile phones

In chart 10 above, the researcher aims to identify students' preferences for vocabulary books that can be opened on mobile phones. From the chart above, there are four options provided by the researcher, and it can be concluded that the option most frequently chosen by students is A (Yes) with a score of 75%.

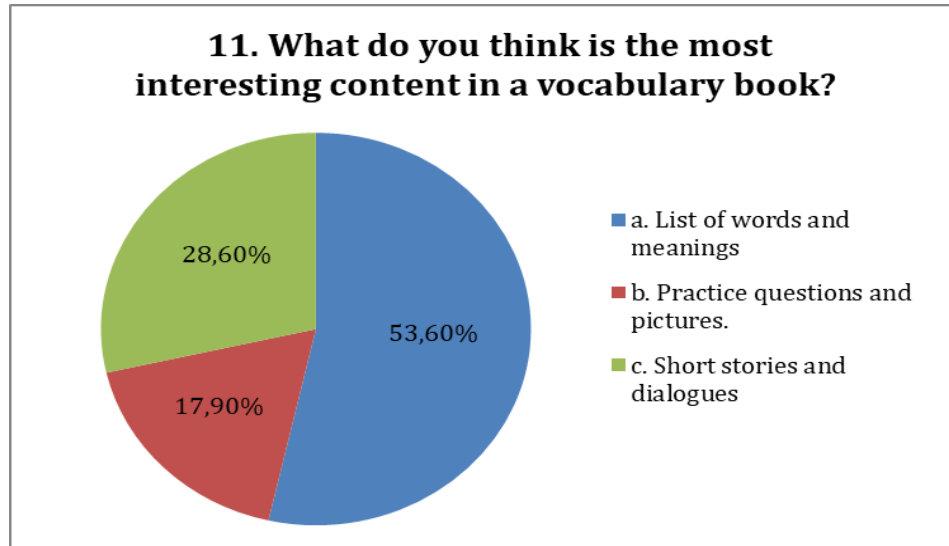


Chart 11. The result of students' percentage of content that is most interesting for students in the vocabulary book

In chart 11 above, the researcher aims to see students' preferences regarding vocabulary book content to improve comfort and effectiveness. From the chart, it can be concluded that 53.60% of 28 students chose option A (List of words and meanings).

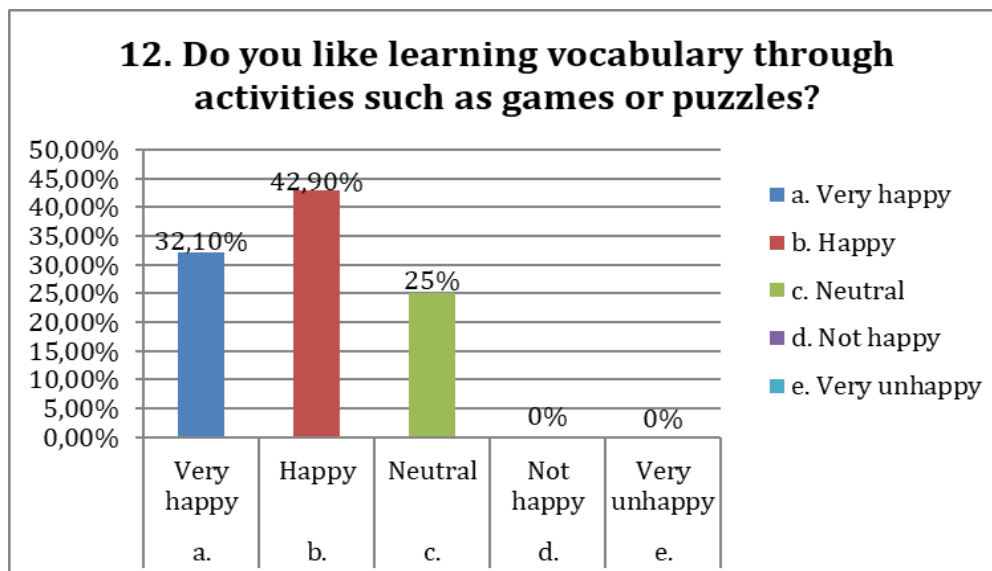


Chart 12. The result of students' percentage of whom like vocabulary learning through activities

The researcher's objective in chart 12 above is to understand students' preferences for providing interesting and relevant material. Based on the chart above, it can be concluded that option B (Happy) is the option most chosen by students with a percentage of 42.90%.

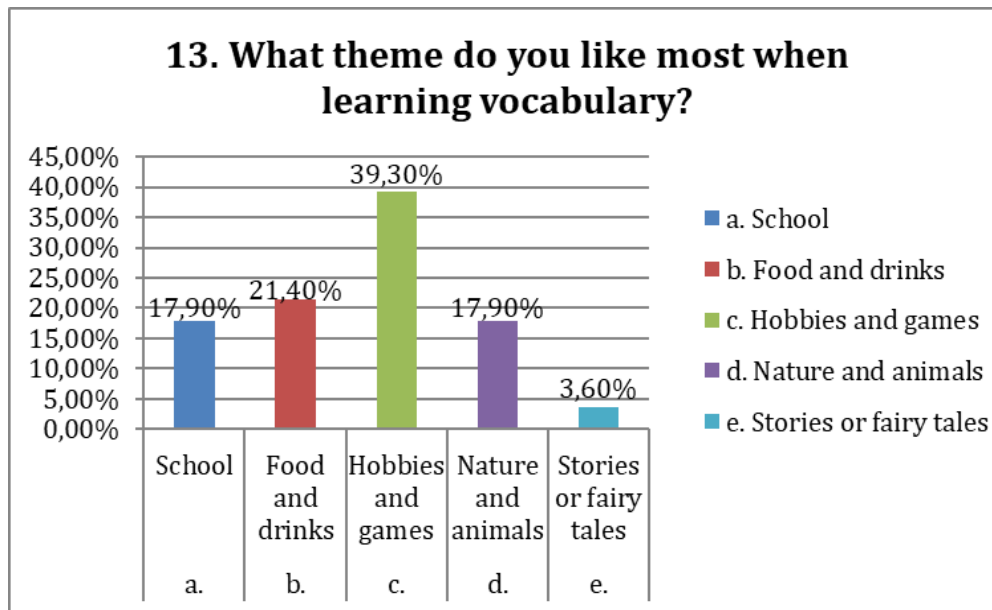


Chart 13. The result of students' percentage of themes that students like when learning vocabulary

In the chart 13 above, the researcher aims to identify the themes that students expect to find in vocabulary books. From the chart above, there are four choices provided by the researcher and one answer provided by the students themselves. It can be concluded that the choice most frequently selected by students is C (Hobbies and games) with a score of 39.30%.

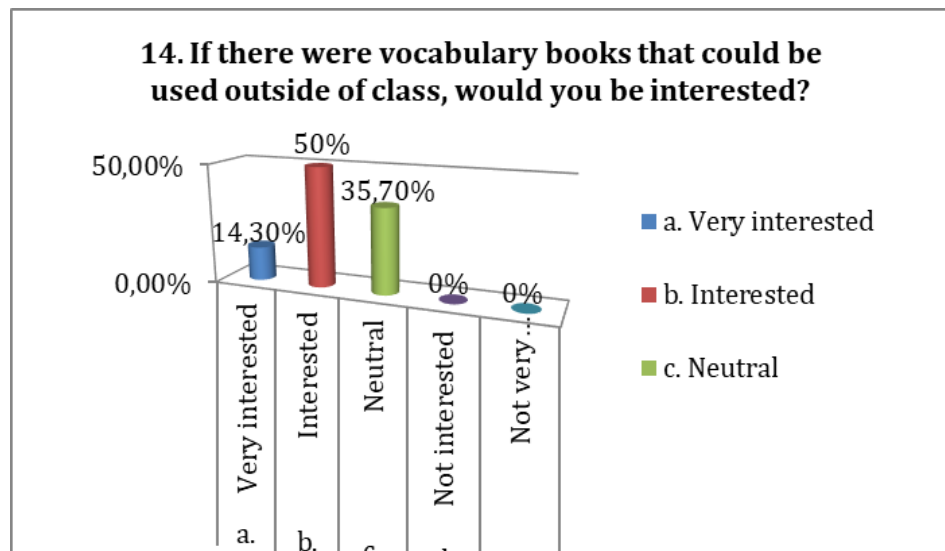


Chart 14. The result of students' percentage of interest in vocabulary books outside of class

The purpose of the researcher in chart 14 above is to see how interested students are in vocabulary books outside of class. Based on the chart above, it can be concluded that option B (Interested) is the option most chosen by students with a percentage of 50%.

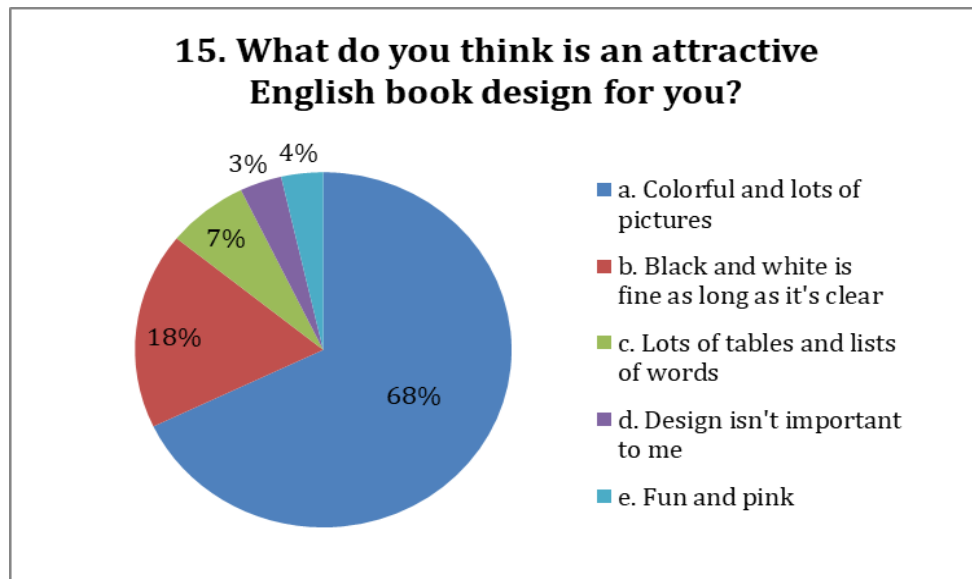


Chart 15. The result of students' percentage of English book designs that student's find interesting

In chart 15 above, the researcher aimed to identify book designs that appealed to them. From the chart above, there were four options provided by the researcher, and it can be concluded that the option most frequently chosen by students was A (Colorful and lots of pictures) with a percentage of 67.90%.

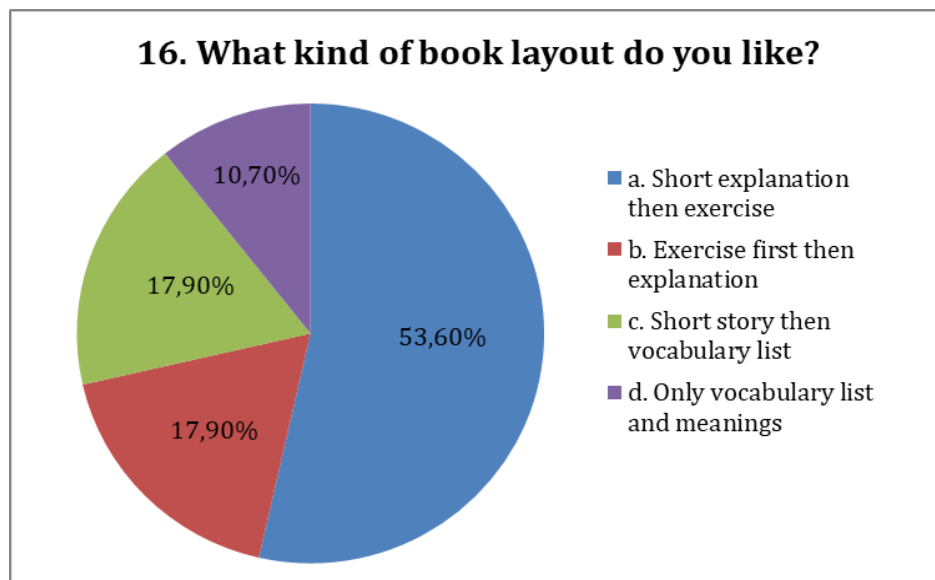


Chart 16. The result of students' percentage of book layout types preferred by students

The questions in chart 16 above aim to determine the book layout preferred by students, so that the vocabulary books provided can be more interesting and relevant to them. The results shown in the figure above explain that there are four layout options provided by the researcher, and the option most chosen by students is A (Short explanation then exercise) with a percentage of 53.60%.

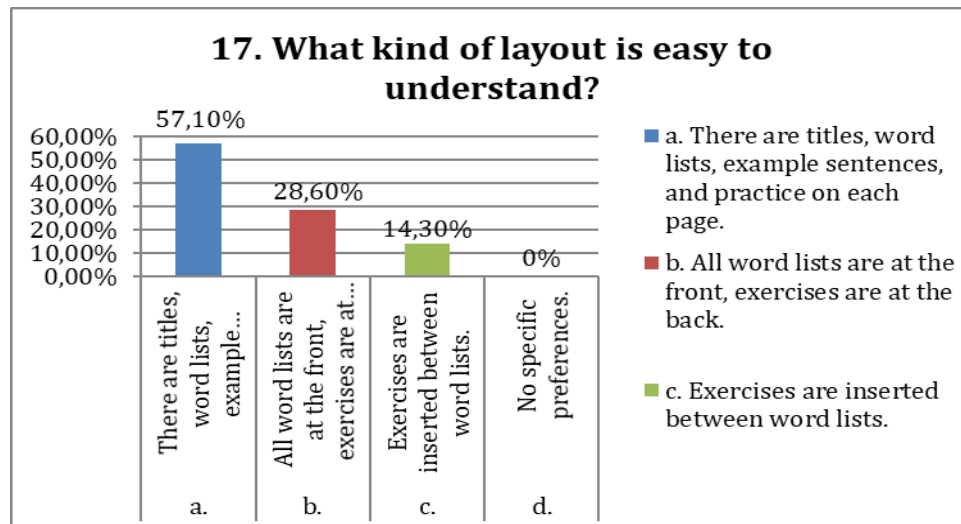


Chart 17. The result of students' percentage of book layouts that is easy to understand

In chart 17 above, the researcher aims to adjust students' preferences regarding the layout of vocabulary books that are easy to understand in order to improve comfort and effectiveness. From the chart, it can be concluded that 57.10% of the 28 students chose option A (There are titles, word lists, example sentences, and practice on each page).

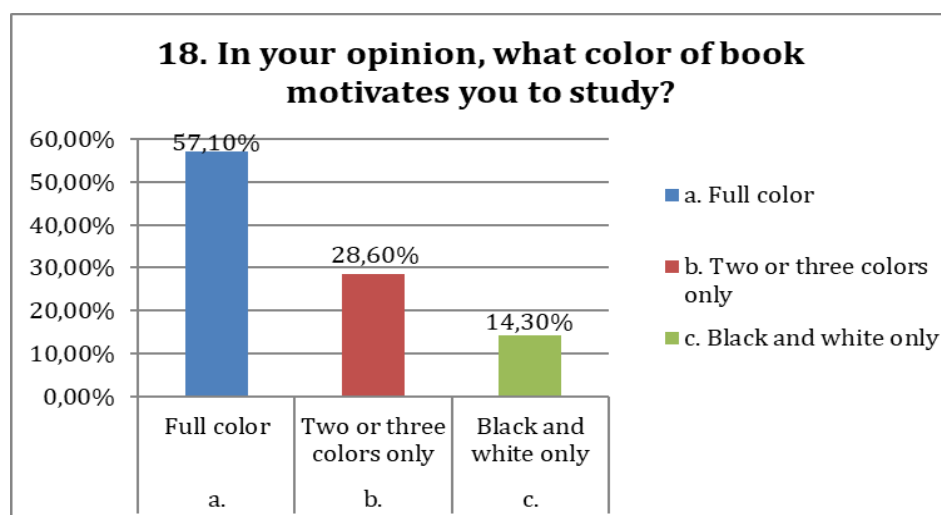


Chart 18. The result of students' percentage of colors in books that motivate students to study

Chart 18 above shows the percentage of students' preferences regarding colors in vocabulary books. There are three choices, and based on the chart, it can be concluded that the choice most frequently selected by students is A (Full color) with a total percentage of 57.10%.

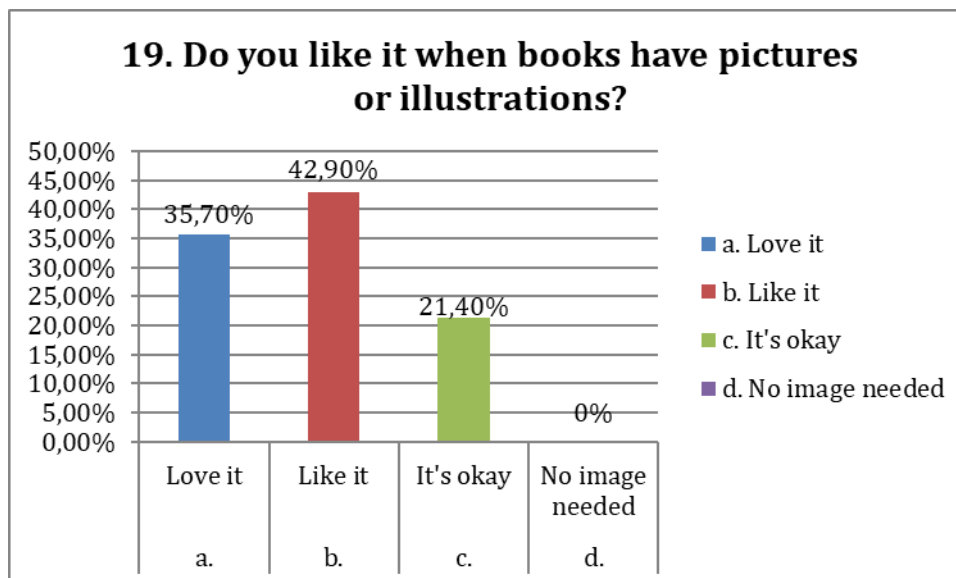


Chart 19. The result of students' percentage of student preference for books containing pictures or illustrations in vocabulary books

In chart 19 above shows the percentage of students' preferences regarding the pictures or illustrations in the vocabulary book. It can be concluded that the option most frequently chosen by students was B (Like it) with a percentage of 42.90%.

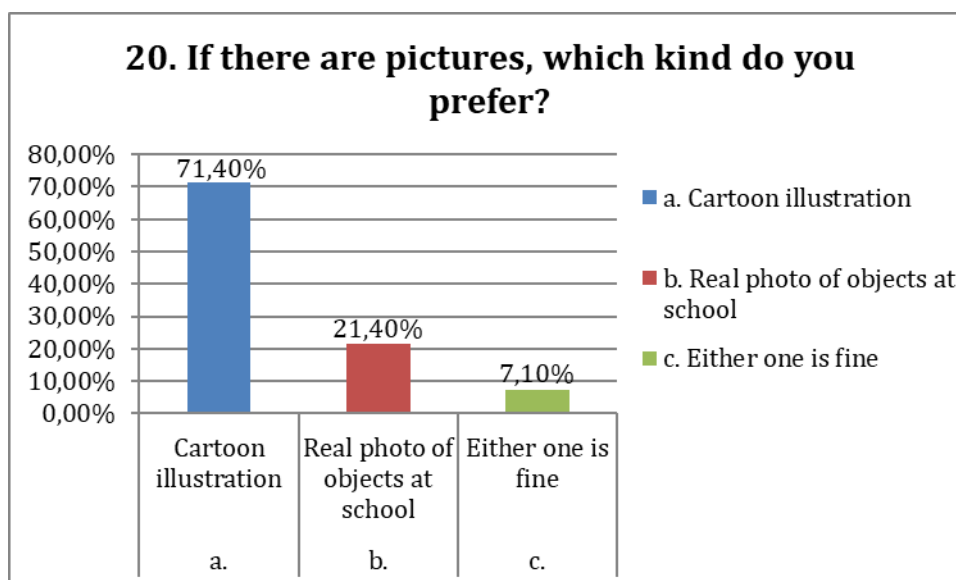


Chart 20. The result of students' percentage of students' preference for pictures or illustrations in vocabulary books

In the chart 20 above, the researcher aims to adjust students' preferences regarding pictures or illustrations in vocabulary books to improve comfort and effectiveness. From the chart, it can be concluded that 71.40% of the 28 students chose option A (Cartoon illustration).

Design stage

The design was based on observational data, interviews, and a needs analysis questionnaire. The design stage steps the following.

Table 1. The Blueprint of the Product

No.	Topic	Element	Content
1.	At the Canteen	List of Vocabulary	Giving students list of vocabularies relevant to each context (e.g., canteen, library, school yard).
		Example Sentence	Showing natural use of vocabulary in communication.
		Practices	Include matching words, fill in the blank, mini dialogue, roleplay, and outside class task.
2.	In the Library	List of Vocabulary	Giving students list of vocabularies relevant to each context (e.g., canteen, library, school yard).
		Example Sentence	Showing natural use of vocabulary in communication.
		Practices	Include matching words, fill in the blank, mini dialogue, roleplay, and outside class task
3.	On The Way to School	List of Vocabulary	Giving students list of vocabularies relevant to each context (e.g., canteen, library, school yard).
		Example Sentence	Showing natural use of vocabulary in communication.
		Practices	Include matching words, fill in the blank, mini dialogue, roleplay, and outside class task
4.	In the School Yard	List of Vocabulary	Giving students list of vocabularies relevant to each context (e.g., canteen, library, school yard).the

		Example Sentence	Showing natural use of vocabulary in communication.
		Practices	Include matching words, fill in the blank, mini dialogue, roleplay, and outside class task
5.	Extracurricular Activity	List of Vocabulary	Giving students list of vocabularies relevant to each context (e.g., canteen, library, school yard).the
		Example Sentence	Showing natural use of vocabulary in communication.
		Practices	Include matching words, fill in the blank, mini dialogue, roleplay, and outside class task
6.	At the Computer Lab	List of Vocabulary	Giving students list of vocabularies relevant to each context (e.g., canteen, library, school yard).the
		Example Sentence	Showing natural use of vocabulary in communication.
		Practices	Include matching words, fill in the blank, mini dialogue, roleplay, and outside class task
7.	At the Mosque	List of Vocabulary	Giving students list of vocabularies relevant to each context (e.g., canteen, library, school yard).the
		Example Sentence	Showing natural use of vocabulary in communication.
		Practices	Include matching words, fill in the blank, mini dialogue, roleplay, and outside class task

Develop stage

Table 2. The Result of the Product Validation by the Material Expert

No	Indicators	Average Score	Categories	Expertise Suggestion
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1	The title is in accordance with the content of the material	3,00	Good	It can be used follow by a little bit revision
2	Suitability of material with illustrations	3,00	Good	It can be used follow by a little bit revision
3	The authenticity of the material with illustrations in the vocabulary book outside activity class is appropriate for students.	3,00	Good	It can be used follow by a little bit revision
4	Fostering student motivation in speaking and reading.	3,00	Good	It can be used follow by a little bit revision
5	The material used in the vocabulary book for outside activity class is correct.	4,00	Excellent	It can be used without revision
6	The material presented is easy to understand.	3,00	Good	It can be used follow by a little bit revision
7	Inputting material in vocabulary books outside of class activities is interesting.	4,00	Excellent	It can be used without revision
8	Inputting material in vocabulary books outside of class activities can increase students' knowledge.	3,00	Good	It can be used follow by a little bit revision
9	The material presented in vocabulary books outside of class activities is in line with the cognitive development level of the students.	3,00	Good	It can be used follow by a little bit revision
10	The whole material is appropriate for the students' abilities.	3,00	Good	It can be used follow by a little bit revision
Total Score		32		

Referring to the data, the average scores (M) from the expert validation results is presented as follows:

$$M = \frac{B}{N} = \frac{32}{10} = 3.2$$

From this mean score, the percentage of the experts' validation is presented as follows:

$$X = \frac{3,2}{4} \times 100\% = 80\%$$

According to the data, the mean score achieves 3,2 point and 80% percentage categorized as "Good". The score indicates that the product can be used with a little bit revision.

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Table 3. The Result of the Product Validation by the Language Expert

No	Indicators	Average Score	Categories	Expertise Suggestion
1	Vocabulary books outside activity is presented with the right sentence structure	4	Excellent	It can be used without revision
2	The storybook uses effective sentences	3	Good	It can be used follow by a little bit revision
3	Vocabulary books outside activity are presented using language that is easy for students to understand.	4	Excellent	It can be used without revision
4	Vocabulary in the vocabulary book outside of class activities according to the students.	4	Excellent	It can be used without revision
5	Vocabulary books for activities outside of class are suitable for the students' language abilities.	4	Excellent	It can be used without revision
6	Vocabulary books outside of class can enrich students' knowledge.	3	Good	It can be used follow by a little bit revision
7	The material uses correct grammar.	3	Good	It can be used follow by a little bit revision
8	The material can increase students' motivation to learn English.	3	Good	It can be used follow by a little bit revision
9	Accuracy of grammar usage in the material.	4	Excellent	It can be used without revision
	Total Score	32		

Referring to the data, the average score (M) from the expert validation results is presented as follows:

$$M = \frac{B}{N} = \frac{32}{9} = 3.55$$

From this mean score, the percentage of the experts' validation is presented as follows:

$$X = \frac{3,55}{4} \times 100\% = 88,75\%$$

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According to the data, the mean score achieves 3,55 point and 88,75% percentage categorized as “Good”. The score indicates that the product can be used with a little bit revision.

Table 4. The Result of the Product Validation by the Design and Layout Expert

No	Indicators	Average Score	Categories	Expertise Suggestion
1	The selection of illustrative images can present the existing material.	3	Good	It can be used follow by a little bit revision
2	The choice of images in the material is appropriate for the students.	4	Excellent	It can be used without revision
3	The color selection in the vocabulary book outside activity class is attractive to students.	4	Excellent	It can be used without revision
4	The cover of the vocabulary book outside activity class is attractive.	3	Good	It can be used follow by a little bit revision
5	The appearance of the vocabulary book outside activity class is attractive.	4	Excellent	It can be used without revision
6	The use of punctuation marks is correct.	3	Good	It can be used follow by a little bit revision
7	The arrangement of material in the vocabulary book outside activity class is systematic.	4	Excellent	It can be used without revision
8	The source in the vocabulary book outside activity class is clear.	4	Excellent	It can be used without revision
9	The spacing in the vocabulary book outside activity class is correct.	4	Excellent	It can be used without revision
	TOTAL SCORE	33		

Referring to the data, the average scores (M) from the expert validation results is presented as follows:

$$M = \frac{B}{N} = \frac{33}{9} = 3.66$$

From this mean score, the percentage of the experts' validation is presented as follows:

$$X = \frac{3,66}{4} \times 100\% = 91.5\%$$

According to the data, the mean score achieves 3,66 point and 91,5% percentage categorized as "Excellent". The score indicates that the product can be used without revision.

Disseminate stage

During the dissemination stage, students are introduced to both the printed and digital versions of the vocabulary book. Researcher explains how to use the materials, including the vocabulary lists, example sentences, and communicative tasks designed for each unit. Students are encouraged to use the printed version for activities at school (such as practicing in the cafeteria, library, and mosque) and to access the digital version in PDF format via their personal cell phones. This dual access helps accommodate different learning preferences and supports independent learning outside of class hours.

After using the book, students were asked to provide feedback through a short questionnaire and informal interviews.

The following are some transcripts of interviews with students.

Note: R for Researcher and S for Student.

Dialogue with Student 1:

R: *Hello, Have you used that book? What do you think about the book?*

S1: *I like it, sir. The pictures are colorful and the topics are about our daily life. It makes me more interested to read it.*

R: *That's good to hear. What about the exercises, are they difficult?*

S1: *No, not really. They are easy to understand.*

Dialogue with Student 2:

R: *How about you, what do you think about the book?*

S2: *I like the vocabulary list, sir. The words are familiar and useful. The mini dialogue also helps me learn how to use them when i speak.*

R: *So, it helps your speaking too?*

S2: *Yes sir.*

Dialogue with Student 3:

R: *What makes this book different from the other English books you've used before?*

S3: *This one can be used outside the class, sir. We can learn English while walking around the school or in the canteen. It's more fun than just sitting in the classroom.*

Dialogue with Student 4:

R: *How about you? Did you use the printed or digital version?*

S4: *Mostly the digital one, sir. I open it on my phone. It's easy and I can study at home or anywhere.*

Dialogue with Students 5:

R: *What part do you like the most?*

S5: *I like the pictures and examples, sir. They help me remember the words faster.*

R: *Do you think it helps with your speaking or writing?*

S2: *Speaking, sir. I can use the new words when I talk with my friends.*

Dialogue with Student 6:

R: *How about you? What part do you like the most?*

S6: *I like the audio, sir. It helps me to fix my pronunciation, sir.*

Dialogue with Student 7:

R: *What do you think about the design of the book?*

S7: *It's nice, sir. The colors make it interesting. But maybe next time, you can add some games or puzzles to make it even more fun.*

R: *That's a good suggestion, thank you.*

Dialogue with Student 8:

R: *Which version do you prefer printed or digital?*

S8: *I use both, sir. Printed at school, and digital at home. It's easier that way.*

R: *So, the combination works well for you?*

S8: *Yes sir.*

Dialogue with Student 9:

R: *How about the topics inside the book?*

S9: *I like them, sir. They're about things we do every day like school, hobbies.*

But maybe you can add more unit, sir.

R: *That's a good suggestion, thank you.*

Dialogue with Student 10:

R: *Are the exercises too hard for you?*

S10: *Some are a bit difficult, sir, but they make me think more. It's good because I learn how to use the words in sentences.*

R: *That's exactly the goal. Well done.*

Dialogue with Student 11:

R: *How do you feel about learning English using this book?*

S11: *I really like it, sir. It's different from other books because we can learn not only in the classroom but also outside.*

R: *Okay thank you.*

Dialogue with Student 12:

R: *What do you think about the digital version of the book?*

S12: *I think it's really good, sir. It's easy to use because I can open it on my phone anytime.*

R: *Okay thank you.*

4) DISCUSSION

This study uses the 4-D model (define, design, develop, and disseminate) developed by S. Thiagarajan, Dorothy S. Semmel, and Melvyn I. Semmel in 1974 to design a vocabulary book for outside class activities. First, at the define stage; the researcher analyzed the needs of SMPN 1 Bua students. The results of the needs analysis show that students need specific and interesting vocabulary books to improve their vocabulary acquisition and reading literacy. Based on the results of the needs analysis, students are more interested in vocabulary books that contain lists of words

and illustrations or pictures. Therefore, the researcher carefully created appropriate and interesting vocabulary books to be included in the book's content.

After completing the define stage, researcher moved on to the next stage, which was the design stage. In this stage, researcher began developing several elements in the book, such as the book title, color selection, and several supporting elements. This vocabulary outside class activities book has seven units, each of which has a list of vocabulary, practice, and mini dialogues.

The third stage of 4D is the development stage. Researcher develops the material that has been compiled in the design stage. Researcher uses the Canva application for further development of this product. This development was carried out by researcher over several weeks. After the first draft was completed by the researcher, this product was then submitted to expert validators for validation. There are three expert validators who validate this product, namely material experts, language experts, and design experts. From these three expert validators, the researcher product received a score of 91.5% and was included in the "Excellent" category with detailed calculations can be seen in table 4.6.

The results of this development led the researcher to the final stage, namely the dissemination stage. At this stage, the researcher gathered students from SMPN 1 Bua in a tryout meeting to introduce the product. At this stage, the researcher explained the contents of the product in detail. In this stage, the researcher also gathered feedback from students at SMPN 1 Bua to determine the effectiveness of the product directly through a short questionnaire and by listening to the students' opinions. After listening directly to various responses and opinions from the students, it can be concluded that the product was well received vocabulary mastery through pre-test and post-test designs.

5) CONCLUSION

This study developed mobile-friendly vocabulary materials for Grade Eight students in rural Indonesia using the 4D Research and Development model. The findings revealed that students faced vocabulary learning difficulties, lacked supporting learning resources, and preferred mobile-accessible materials.

Based on these needs, the researcher developed a vocabulary product consisting of printed and digital PDF versions. The materials contained thematic vocabulary units, mini-dialogues, and practice tasks designed for classroom and outside-class learning.

Expert validation results showed that the product achieved good to excellent categories in content, language, and design aspects. In addition, students responded positively to the materials during the limited try-out stage, indicating that the product was practical, attractive, and useful for independent vocabulary learning.

Overall, the study demonstrates that mobile-friendly vocabulary materials can support accessible and flexible vocabulary learning for rural EFL learners. The findings suggest that simple and offline-accessible mobile learning materials can become practical solutions for improving English learning opportunities in rural contexts.

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